Philadelphia University
Faculty of Pharmacy
Department of clinical Sciences
Second Semester, 2016/2017

Course Syllabus

Course Title: Biopharmaceutics & Pharmacokinetics **1**	**Course code: 0510423**
Course Level: 4th year	**Course Co-requisite (s):** pharma.2**(0510335)**
Lecture Time: 10-11	**1. Credit hours:** 3-credit hours

Academic Staff Specifics

Name	**Rank**	Office Number and Location	Office Hours	**E-mail Address**
Yazan Bataineh Farah abdulgalyl	Assistant Professor Lecturer	5517	From 12 To 1,00	ybatineh@philadelphia.edu.jo

Course module description and objectives:

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This course is devoted to the exploration and examination of the physical and physicochemical behavior of drugs, dosage forms, and drug delivery systems in physiological milieu and their implications for pharmaceutical care. Drug absorption processes, bioavailability, and bioequivalence will be highlighted. Pharmacokinetic and Pharmacodynamic concepts, including absorption kinetics, volume of distribution, and compartmental models, will be introduced to the student.

Course/ module components

- **Books**

Applied Biopharmaceutics and Pharmacokinetics., Shargel and A.B.C. Yu., Appleton & Lange/MacGraw-Hill, New York., 4th edition 1999. ISBN 0-8385-0129-X

- **Support material (s)**

- Specialized softwares as WinNonlin® standard and PowerPoint presentations.
- **Pharmacokinetic Cases.**

Prepared by the lecturer, adapted from the text book and other references.

Teaching methods:

Lectures and seminars.

Learning outcomes:

At the end of this module, student will be able to:

1. Understand the compartmental modeling and it's significance
2. Understand drug absorption, distribution and elimination
3. Understand drug clearance including (total, renal and hepatic clearance)
4. Understand pharmacokinetics and biopharmaceutics after I.V bolus, I.V infusion, and oral administration of drugs.
5. Understand protein binding and its effects
6. Understand bioavailability and bioequivalence
7. Understand Multiple dosage regimen
8. Have a knowledge on biopharmaceutics considerations in dosage form design

- Cognitive skills (thinking and analysis).

The student should be able to analyze and scientifically use equations which will help him understand the processes that the drug undergoes inside the system and the fate of this drug.

- Communication skills (personal and academic).
  - Adapting a problem solving approach through allowing the student to argue his point of view to his colleagues.
  - Adapting group discussion technique.

- Practical and subject specific skills (Transferable Skills).
  - Handle the semi-log and standard graph papers, and distinguish the resulted curves generated by ordered processes, and ability to calculate slopes and intercepts to extract pharmacokinetic processes according to the model under question.
  - Use raw data and derive the pharmacokinetic models and parameters that best describe the process of drug absorption, distribution and elimination.

Assessment instruments

Allocation of Marks	
Assessment Instruments	**Mark**
First Exam	**20%**
Second Exam	**20%**
Assignment / Seminar / Quizzes.	**20%**
Final examination	**40%**
	100%

Documentation and academic honesty

Course/module academic calendar

Week	Basic and support material to be covered
(1)	Review of **the following**
	Mathematical fundamentals in pharmacokinetics
2	Review of rates and orders of reactions: 1st order and 2nd order: practice problems
3 4	One-Compartment mathematical open model: intravenous bolus administration: Elimination rate constant, apparent volume of distribution, clearance, area under the curve, calculation from plasma data, practice problems
5 6	Multi-Compartment model: intravenous bolus administration: Two-compartment model: Pharmacokinetics parameters: half-life, rate constants, volume of distribution, area under the curve, practice problems
6	Revision and first examination
7 8	Drug elimination and clearance 1) Renal drug excretion 2) Drug clearance i) Determination of renal clearance ii) Determination of hepatic clearance
9 10	Drug elimination and clearance: Practice problems
	Multiple dosing regimen: Drug accumulation, repetitive IV injection, loading dose, scheduling of dosage regimen
13	Multiple dosing: Practice problems Revision and second examination
14, 15)	Bioavailability and bioequivalence: relative and absolute bioavailability, methods of assessing bioavailability, short overview of bioequivalence studies, practice problems
16)	Revision and final examination
16)	**Final Exam Week**

Expected workload:

On average you should expect to spend at least (6) hours per week on this module.

Attendance policy:

Absence from lectures and/or tutorials shall not exceed 15%. Students who exceed the 15% limit without a medical or emergency excuse acceptable to and approved by the Dean of the relevant college/faculty shall not be allowed to take the final examination and shall receive a mark of zero for the course. If the Dean approves the excuse, the student shall be considered to have withdrawn from the course.

Module references

Textbook:

Shargel and A.B.C. Yu. Applied Biopharmaceutics and Pharmacokinetics, 5th edition 2004. Appleton & Lange/MacGraw-Hill, New York. ISBN 0-8385-0129-X

In addition to the above, the students will be provided with handouts by the lecturer.

Other References:

Students will be expected to give the same attention to these references as given to the Module textbook(s)

1. Merck Index: An Encyclopedia of Chemicals, Drugs, & Biologicals
by Merck, Co, Maryadele J. Oneil (Editor), Ann Smith (Editor) 13th edition (October 2001), Merck & Co; ISBN: 0911910131

2. Physical Pharmacy: Physical Chemical Principles in the Pharmaceutical Sciences
by Alfred Martin, Pilar Bustamante, A.H.C. Chun (Illustrator)
622 pages 4th edition (January 15, 1993), Lea & Febiger; ISBN: 0812114388

3. Remington: The Science and Practice of Pharmacy
by Alfonso R. Gennaro (Editor) 20th edition (December 15, 2000), Lippincott, Williams & Wilkins; ISBN: 0683306472

Website(s):

http://www.philadelphia.edu.jo/pharmacy/resources.html